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ABSTRACT

Documented are developments in federal funding to individual colleges and universities. It is reported, based on fiscal year (FY) 1977 data, that federal obligations to higher education institutions have grown substantially. Federal research and development (R&D) funds rose by 15% in FY 1977. However, federal funding for academic R&D in 1977 was only about one-fourth the level of the mid-1960's. While R&D support has increased every year throughout the 1970's, other components of federal support to academic science showed an increase only in 1974. Data are presented on FY 1977 federal money committments to the 100 universities receiving the largest amounts of funds. (RE)

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SCIENCE RESOURCES STUDIES HIGHLIGHTS

NATIONAL SCIENCE FOUNDATION WASHINGTON, D.C. 20550 AUGUST 1, 1979 NSF 79-312

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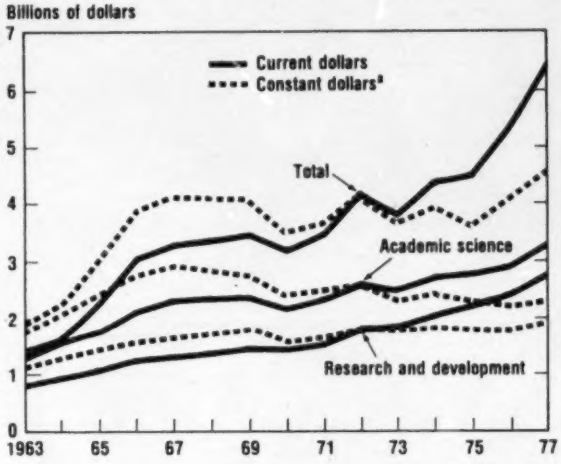
Federal Obligations to Universities and Colleges Increased by 20% in FY1977—Primarily for Nonscience Programs

The NSF, by congressional mandate, collects and analyzes annually data on Federal funds obligated to individual universities and colleges for use in the development and evaluation of Federal and State education policies, as well as by academic officials in their internal planning. The survey is directed to 14 Federal agencies with large programs in support of academic science. These agencies accounted for over 99 percent of all Federal R&D obligations to universities and colleges,[1] and about 95 percent of all Federal obligations to academic institutions for all purposes. The fiscal year 1977 data presented here represent the latest figures available, since most of the participating agencies are unable to prepare their responses until well after the close of the fiscal year covered.

Highlights

- For the second consecutive year, Federal obligations to universities and colleges have shown substantial growth, in both current and constant dollars—20 percent and 13 percent, respectively. The total of $6.5 billion was a new high in both current and real terms (chart 1). As in 1976, most of the increase funded nonscience programs (64 percent), led by the Office of Education's Basic Educational Opportunity Grants (BEOG's).
- Federal R&D support to universities and colleges rose by 15 percent in fiscal year 1977 and at an average rate of 14 percent over the 1977-79 period. However, the Federal fiscal year 1980 budget calls for only a 5-percent increase which, in contrast to the three previous years, will produce a decline in constant-dollar terms.
- The proportion of Federal R&D funds going to universities and colleges has gradually increased since 1970 when 1 out of every 10 dollars in Federal R&D support went to academic institutions. By 1977, this ratio had grown to $1.20 of every 10 dollars and, based on the President's 1980 budget, it will continue to grow to $1.50 in 1980. The increased emphasis on basic research in the last three Federal budgets is primarily responsible for the higher ratio anticipated for 1980.

Chart 1. Federal obligations to universities and colleges by type of activity: FY 1963-77



Category	Average annual rates of change			
	Current		Constant	
	1963-75	1975-77	1963-75	1975-77
Total	10.2	19.5	5.3	11.8
Academic science	6.4	9.3	1.7	2.3
R&D	8.6	11.6	3.8	4.5

[a]Based on GNP implicit price deflator.
SOURCE: National Science Foundation

[1] Other agencies obligated only $9 million for research and development to universities and colleges, according to data in the National Science Foundation's, *Detailed Statistical Tables. Federal Funds for Research and Development, Fiscal Years 1977, 1978, and 1979*, Volume XXVII (NSF 78-312) (Washington, D.C. 20550, 1978), pp. 14-15.

Prepared in the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies

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• Federal funding for academic R&D plant in 1977 was only at about one-fourth the level that was obligated for such purposes in the midsixties. At that time academic institutions underwent unequaled growth in research facilities and instrumentation funds to accommodate large influxes of graduate students and sizable increases in the support of academic research by Federal agencies.

• While the R&D portion of Federal science support to universities and colleges has increased every year throughout the seventies, the other components of Federal academic science support have recorded only one increase and that was in 1974 resulting from the release of some $60 million in impounded 1973 funds. Funding in 1977 for instructional facilities and equipment, direct science student assistance, general support programs, and, as noted above, R&D plant funds,are at less than one-half the level made available in 1971. At the same time, funding for nonscience programs, such as the BEOG's, have more than doubled with the result that academic science funding has dropped from two-thirds of total Federal support to universities and colleges in 1970 to just over one-half in 1977.

• One of the more significant impacts of the changing composition of federally funded academic programs has been the decrease in the concentration of funds among individual universities and colleges. Just since 1970, the portion of Federal funds awarded to the first 100 institutions ranked in terms of the level of Federal funds received has dropped from 71 percent to 56 percent in 1977.

Academic Science Activities

Federal agencies obligated $3,335 million for academic science activities in 1977, a 13-percent increase over 1976, or a 6-percent increase in constant-dollar terms. This represents the first real-dollar rise in academic science funding since 1974.

Funding for research and development accounted for over nine-tenths of the increase in academic science funding. All academic science activities in 1977 reported current-dollar growth over 1976 totals except for "other science activities" (a 2-percent decline) which includes such programs as support of technical conferences, training of undergraduates, precollege students, and special training courses for science teachers. In 1976 the only significant funding increase was for research and development (table 1).

RESEARCH AND DEVELOPMENT

The 10 universities receiving the largest obligations for research and development in 1977 accounted for 23 percent of Federal funding to all universities and colleges, the same as in 1976. As in prior years, the Massachusetts Institute of Technology was the top recipient of Federal R&D support (table 2). Nineteen

Table 1. Federal obligations to universities and colleges by types of activity: FY 1975-77

[Dollars in millions]

Type of activity	1975	1976	1977
Total	$4,533.3	$5,386.7	$6,473.1
Academic science	2,791.8	2,943.6	3,335.3
Research and development	2,224.8	2,407.0	2,772.4
R&D plant	44.8	23.9	36.5
Facilities and equipment for instruction	12.4	11.1	17.8
Fellowships, traineeships, and training grants	201.3	174.9	184.7
General support for science	46.4	74.5	75.9
Other science activities	262.3	252.2	248.0
Nonscience	1,741.4	2,443.2	3,137.9

Source: National Science Foundation.

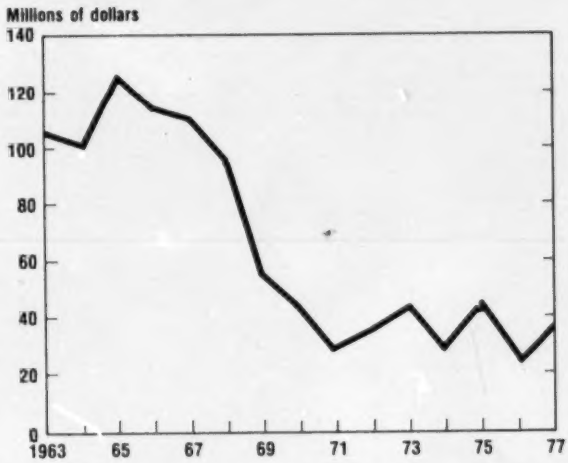
institutions were ranked among the top 20 in both 1976 and 1977.

The Department of Transportation (DOT) obligated one-half of its R&D support funds to the leading 20 research universities, largely for engineering research. Four other agencies—Department of Health, Education, and Welfare (HEW), National Science Foundation (NSF), Energy Research and Development Administration (ERDA), and National Aeronautics and Space Administration (NASA)—concentrated over 40 percent of their R&D support to those institutions, predominately in the life sciences, physical sciences, and engineering.

R&D Plant

In five of the seven years between 1970 and 1977, fluctuations occurred in Federal funding for R&D plant

Chart 2. Federal obligations to universities and colleges for R&D plant: FY 1963-77



SOURCE: National Science Foundation

Table 2. Federal obligations to the 100 universities and colleges receiving the largest amounts[1]: FY 1977

(Dollars in thousands)

Rank	Institution (Ranked by total Federal obligations)	Total, all activities[2]	Research and development[2]	R&D rank
	United States, Total	$6,473,110	$2,772,430	
1	Howard University[3]	115,930	5,163	126
2	Mass Inst of Technology	109,439	91,771	1
3	University of Washington	96,924	69,501	4
4	Univ of Cal Los Angeles	96,363	73,232	3
5	University of Minnesota	92,684	50,013	11
6	Stanford University	84,926	73,400	2
7	Harvard University	76,707	58,108	7
8	Univ of Cal San Diego	74,944	68,579	5
9	University of Michigan	74,504	52,051	9
10	Columbia Univ Main Div	74,425	60,129	6
	Total 1st 10 Institutions	896,846	601,947	
11	Univ of Wis-Madison	72,606	53,027	8
12	Cornell University	69,986	49,550	12
13	Univ of Pennsylvania	68,829	48,119	13
14	Univ of Cal Berkeley	66,693	43,484	16
15	Johns Hopkins University	64,435	51,075	10
16	Yale University	60,154	47,318	14
17	University of Chicago	54,209	45,852	15
18	Ohio State University	54,091	25,244	26
19	Univ of Southern Cal	53,778	36,967	19
20	Univ of Ill Urbana	52,603	38,435	17
	Total 1st 20 Institutions	1,514,230	1,041,018	
21	Pennsylvania State Univ	49,223	23,003	33
22	New York University	48,327	35,357	21
23	University of Colorado	47,970	29,858	22
24	Univ of Cal San Francisco	46,445	36,499	20
25	Washington University	45,367	37,755	18
26	University of Rochester	42,885	26,388	24
27	Michigan State University	42,641	19,993	39
28	University of Miami	40,550	24,116	30
29	Duke University	40,403	29,627	23
30	U P R Med Sci Campus	40,014	3,020	152
	Total 1st 30 Institutions	1,958,055	1,306,634	
31	Univ of NC at Chapel Hill	38,906	21,249	35
32	Purdue Univ all campuses	37,853	23,742	31
33	University of Arizona	36,951	24,653	28
34	University of Utah	35,500	24,329	29
35	University of Pittsburgh	34,883	20,888	36
36	Yeshiva University	34,410	26,244	25
37	Georgetown University	33,860	11,743	72
38	Boston University	33,020	17,199	51
39	University of Iowa	32,005	21,425	34
40	Northwestern University	31,911	23,319	32
	Total 1st 40 Institutions	2,307,354	1,521,425	
41	University of Florida	31,701	18,432	48
42	Univ Alabama Birmingham	31,548	18,862	46
43	Colorado State University	31,016	18,878	45
44	Inter Amer Univ of P R	30,362	19	530
45	Univ of Ky all campuses	30,179	10,095	80
46	Univ of Texas at Austin	30,146	25,003	27
47	Case Western Reserve Univ	28,808	19,869	40
48	Texas A&M University	28,799	14,431	60
49	University of New Mexico	28,529	13,231	65
50	Univ of Cal Davis	28,234	19,440	41
	Total 1st 50 Institutions	2,606,676	1,679,685	
51	Univ of Hawaii-Manoa	$28,217	$18,916	44
52	Univ of Md College Park	27,102	18,535	47
53	Univ of Missouri Columbia	26,085	12,402	68
54	Oregon State University	26,009	19,182	42
55	University of Virginia	25,791	17,212	50
56	Washington State Univ	25,384	7,725	92
57	Univ of Mass at Amherst	24,964	9,749	84
58	University of Kansas	24,871	13,246	64
59	Baylor Col of Medicine	24,000	20,338	38
60	Rutgers the St Univ of NJ	23,889	10,188	78
	Total 1st 60 Institutions	2,862,988	1,827,178	
61	Temple University	23,707	12,434	67
62	California Inst of Tech	23,203	20,804	37
63	Wayne State University	22,504	10,155	79
64	NC State Univ at Raleigh	22,425	11,448	74
65	University of Connecticut	22,333	12,773	66
66	La St Univ—All campuses	22,272	10,058	81
67	Tufts University	22,260	6,675	103
68	University of Georgia	22,123	10,741	76
69	University of Alaska	21,862	18,414	49
70	U Tennessee Knoxville	21,784	13,311	62
	Total 1st 70 Institutions	3,087,461	1,953,991	
71	Univ of Md Balt Prof Sch	21,605	15,312	59
72	University of Cincinnati	21,515	9,582	85
73	Tulane University	21,326	8,039	90
74	Georgia Institute of Tech	21,015	19,138	43
75	Vanderbilt University	20,814	16,449	53
76	U Tex Hlth Sc Ctr Dallas	20,581	15,688	57
77	CUNY Mt Sinai Sch of Med	20,184	16,707	52
78	Meharry Medical College	20,141	1,070	200
79	Princeton University	19,970	16,331	54
80	New Mexico State Univ	19,630	12,268	70
	Total 1st 80 Institutions	3,294,242	2,084,575	
81	George Washington Univ	19,615	13,437	61
82	Indiana Univ-Bloomington	19,566	10,906	75
83	SUNY at Buffalo	19,166	12,376	69
84	Gallaudet College[3]	18,725	239	298
85	U Tex-Andrsn Hosp & Tumor Inst	18,245	16,284	55
86	Oklahoma State University	18,137	7,166	97
87	Woods Hole Ocngrphic Inst	18,011	15,988	56
88	Emory University	17,813	11,779	71
89	Va Polytech Inst & St U	17,783	9,845	83
90	Virginia Commonwith Univ	17,420	9,178	88
	Total 1st 90 Institutions	3,478,723	2,191,773	
91	U of Vermont & St Agr Col	17,055	9,276	87
92	Iowa St U of Sci & Tech	16,953	7,572	94
93	Rockefeller University	16,814	15,344	58
94	Auburn University	16,256	5,410	63
95	Carnegie Mellon Univ	16,028	13,303	63
96	City Colleges of Chicago	15,900	0	
97	Mississippi State Univ	15,814	5,140	127
98	Indiana U-Purdue U Indpls	15,796	7,352	95
99	SUNY at Stony Brook	15,204	11,470	73
100	Catholic Univ of P R	14,983	0	
	Total 1st 100 Institutions	3,639,526	2,266,640	

[1] Amounts shown represent awards to individual institutions. Awards to the administrative offices of university systems are excluded from institutional totals because final allocation of funds is unknown but are included in "United States total."

[2] Amounts shown represent total obligations from 14 Federal agencies which accounted for over 95 percent of all Federal obligations to universities and colleges in the United States and for 98 percent of all Federal obligations for research and development to such institutions. These proportions may not apply to all individual institutions, some of which receive significant amounts of their funding from agencies not included in the survey, such as the Department of Justice, the Veterans Administration, and the Smithsonian Institution.

[3] Howard University and Gallaudet College receive substantial appropriations from Congress each year for general operating expenses; their relative rankings thus reflect the magnitude of their nonscience programs.

SOURCE: National Science Foundation

at universities and colleges ranging between 23 percent and 54 percent of the previous year's total. This high degree of fluctuation is probably a factor of the large amounts required for the relatively small number of individual construction projects supported by the Government since 1969 and the fact that these were not funded at a steady rate. In 1977 R&D plant obligations represented only one-fourth the peak level of $126 milllion reported in 1965 (chart 2).

Largely because of ERDA funding of $17.5 million (more than triple its 1976 funding level), R&D equipment and facility funds increased to $36.5 million in 1977. Most of the increase was attributed to the construction of facilities for the conduct of research programs in fusion and in high-energy physics.

All Other Science Activities

The increase in funding between 1976 and 1977 for the all-other-science-activities category as a whole (including facilities and equipment for instruction; fellowships, traineeships, and training grants; and general support for science) was only the second increase since 1971. These funds increased by 3 percent to $526 million in 1977, and HEW and NSF made up most of the increase in funding for fellowships, traineeships, and training grants and for facilities and equipment for instruction.

Federal funding of fellowships, traineeships, and training grants in 1977 ($185 million) represented a level that in current dollars was less than one-half of the $421 million obligated in 1971, the first year for which these data are available. This decline resulted from the Federal Government's earlier decision to deemphasize direct support of graduate students through traineeship programs in view of an expected ample supply of Ph.D.'s in most disciplines. Consequently, the proportion of full-time graduate students in doctorate-level institutions primarily supported by Federal funds dropped from 32 percent in 1971 to 23 percent in 1977.[3] This decline in the number of fellows and trainees was partially offset, however, by increases in the last few years in research assistants working on federally supported projects (up 16 percent since 1973).

Nonscience Activities

Funding for nonscience activities accelerated to an annual average rate of increase of 34 percent (26 percent in real terms) between 1975 and 1977 to a high of $3.1 billion. In contrast, nonscience funding increased by only 1 percent per year between 1967 and 1975 in real dollars. This type of Federal funding represented nearly one-half of all Federal support to academic institutions in 1977 compared to 30 percent in 1967. The recent increases in this funding category results mostly from an expansion of the BEOG's program which grew from the support of 89,000 postsecondary students in academic year 1974-75 to the support of 1,931,000 students in 1976-77.[4] For 1978, a total of $1.6 billion was appropriated to assist 1.8 million students. Funding for this purpose has been increased to $2.4 billion in 1979 to assist 2.7 million students, but the proposed Federal budget for 1980 calls for a decrease to $1.8 billion, supporting 2.6 million students.

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[3] National Science Foundation, *Detailed Statistical Tables. Graduate Science Education: Student Support and Postdoctorals, Fall 1977* (NSF 78-315), p. 40 and *Fall 1972* (NSF 73-315) (Washington, D.C. 20550.)

[4] Office of Management and Budget, *Appendix to the Budget of the United States Government, Fiscal Year 1978* (Washington, D.C. 20402: Supt. of Documents, U.S. Government Printing Office), p. 337.

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Detailed Statistical Tables. Federal Support to Universities, Colleges and Selected Nonprofit Institutions, Fiscal Year 1977 (NSF 79-311) may be obtained from the Division of Science Resources Studies, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550. A complete analytical report will be available later in the year.

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